

That which is claimed is:

1. A search method for identifying one or more candidate delays for a receiver comprising:

5 receiving a signal having one or more signal images, each signal image having a corresponding signal delay;  
generating a hierarchical delay tree for the received signal comprising a plurality of delay nodes in a lowermost level of the delay tree linked by branches and one or more linking nodes to a root node at the highest level of the delay tree,  
10 wherein each delay node is associated with one of the signal delays;  
searching through the delay tree to identify one or more surviving delay nodes; and  
selecting one or more surviving delay nodes as the candidate delays.

2. The search method of claim 1 wherein searching through the delay tree comprises:  
15 traversing downward through the delay tree; and  
at each level of the delay tree below the root node, identifying one or more surviving nodes.

3. The search method of claim 2 further comprising:  
20 identifying non-surviving nodes at each level of the delay tree below the root node;  
and  
deleting subtrees depending from the non-surviving nodes such that the subsequent searches through the lower levels of the delay tree do not include the deleted subtrees.

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4. The search method of claim 2 wherein identifying one or more surviving nodes comprises:

determining a level threshold for each level of the delay tree below the root node;  
comparing the nodes at one or more levels to the corresponding level threshold; and  
5 identifying the nodes that meet or exceed the level threshold as the surviving nodes.

5. The method of claim 4 wherein searching through the delay tree to identify one or more surviving delay nodes further comprises repetitively searching through the delay tree until a desired number of candidate delays are identified.

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6. The method of claim 5 wherein repetitively searching through the delay tree until a desired number of candidate delays are identified further comprises increasing the level thresholds in a repeat search relative to an initial search to reduce the number of candidate delays identified.

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7. The method of claim 6 wherein repetitively searching through the delay tree until a desired number of candidate delays are identified further comprises limiting the repeat search to subtrees depending from surviving nodes in the previous search.

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8. The method of claim 5 wherein repetitively searching through the delay tree until a desired number of candidate delays are identified further comprises decreasing the level thresholds in a repeat search relative to an initial search to increase the number of candidate delays identified.

9. The method of claim 8 wherein repetitively searching through the delay tree until a desired number of candidate delays are identified further comprises limiting the repeat search to subtrees depending from non-surviving nodes in the previous search.

5 10. The search method of claim 1 further comprising inputting the candidate delays corresponding to the surviving delay nodes into a state machine, said state machine comprising a plurality of ordered states including a start state, a steady state, and an exit state.

11. The search method of claim 10 further comprising assigning one or more candidate  
10 delays in one or more states of the state machine to a demodulator.

12. The search method of claim 10 further comprising promoting and demoting candidate delays present in the state machine responsive to the results of searching through the delay tree.

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13. The search method of claim 12 wherein promoting and demoting candidate delays present in the state machine responsive to the results of searching through the delay tree comprises promoting candidate delays present in the state machine from a first state to a second state when the candidate delay corresponds to a surviving delay node.

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14. The search method of claim 12 wherein promoting and demoting candidate delays present in the state machine responsive to the results of searching through the delay tree comprises demoting candidate delays present in the state machine from a first state to a second state when the candidate delay corresponds to a non-surviving delay node.

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15. The search method of claim 10 further comprising deleting one or more candidate from the exit state of the state machine responsive to the results of searching through the delay tree.
- 5 16. The search method of claim 1 wherein generating a hierarchical delay tree comprises:  
determining a signal characteristic for one or more signal delays;  
assigning a value based on the signal characteristics to the delay nodes;  
assigning a value to each linking node equal to the sum of the nodes in the next lower  
level connected by branches to the linking node; and  
10 assigning a value to the root node equal to the sum of the linking nodes at the level  
below the root node connected by branches to the root node.
17. The search method of claim 16 wherein determining the signal characteristic for the one or more signal delays comprises determining a signal energy associated with each of the  
15 one or more signal delays.
18. The search method of claim 16 wherein determining the signal characteristic for the one or more signal delays comprises determining a signal-to-noise ratio associated with each  
of the one or more signal delays.  
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19. The search method of claim 1 wherein generating a hierarchical delay tree comprises generating a binary delay tree.
20. The search method of claim 19 wherein generating a binary delay tree comprises  
25 generating a balanced binary delay tree.

21. The search method of claim 1 wherein receiving a signal having one or more signal images comprises receiving a first signal transmitted from a first antenna, said first signal having one or more signal images.

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22. The search method of claim 21 further comprising:  
receiving a second signal transmitted from a second antenna, said second signal  
having one or more signal images;  
generating a second hierarchical delay tree for the second signal;  
10 searching through both delay trees to identify a set of surviving delay nodes  
associated with the first and second signals; and  
selecting one or more surviving delay nodes from the set of surviving delay nodes as  
the candidate delays associated with the first and second signals.

15 23. The search method of claim 1 wherein receiving a signal having one or more signal images comprises receiving the signal at first and second receive antennas.

24. The search method of claim 23 further comprising combining signal characteristics measured at the first and second receive antennas into a composite characteristic, wherein  
20 generating a hierarchical delay tree comprises generating a hierarchical delay tree for the composite characteristic.

25. The search method of claim 23 wherein generating the hierarchical delay tree comprises generating a first hierarchical delay tree for the signal delays associated with the

first receive antenna and generating a second hierarchical delay tree for the signal delays associated with the second receive antenna.

26. The search method of claim 25 wherein searching through the delay tree comprises  
5 searching through the first delay tree to identify one or more surviving delay nodes associated with the first receive antenna and searching through the second delay tree to identify one or more surviving delay nodes associated with the second receive antenna.

27. The search method of claim 1 wherein the receiver is a RAKE receiver.

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28. A selection method for selecting one or more signal delays for a receiver that receives a signal having one or more signal images, each signal image having a corresponding signal delay, the selection method comprising:

searching the signal delays for one or more surviving signal delays;

5 inputting candidate delays corresponding to the surviving signal delays into a state machine, said state machine comprising a plurality of ordered states including a start state, a steady state, and an exit state;

promoting and demoting candidate delays present in the state machine responsive to the results of searching for one or more surviving signal delays; and

10 assigning one or more candidate delays in one or more states of the state machine to a demodulator.

29. The selection method of claim 28 wherein assigning one or more candidate delays in one or more states of the state machine to the demodulator comprises assigning one or more  
15 candidate delays in the steady state to the demodulator.

30. The selection method of claim 28 further comprising ranking the candidate delays according to a predetermined ranking criteria and assigning one or more candidate delays to the demodulator based on the ranking.

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31. The selection method of claim 28 wherein promoting and demoting candidate delays present in the state machine responsive to the results of searching for one or more surviving signal delays comprises promoting candidate delays present in the state machine from a first state to an adjacent second state when the candidate delay corresponds to a surviving signal  
25 delay.

32. The selection method of claim 28 wherein promoting and demoting candidate delays present in the state machine responsive to the results of searching for one or more surviving signal delays comprises promoting candidate delays in the state machine from a first state to a  
5 non-adjacent second state when the candidate delay corresponds to a surviving signal delay.

33. The selection method of claim 28 wherein promoting and demoting candidate delays present in the state machine responsive to the results of searching for one or more surviving delays comprises demoting candidate delays present in the state machine from a first state to  
10 an adjacent second state when the candidate delay corresponds to a non-surviving signal delay.

34. The selection method of claim 28 wherein promoting and demoting candidate delays present in the state machine responsive to the results of searching for one or more surviving  
15 delays comprises demoting candidate delays in the state machine from a first state to a non-adjacent second state when the candidate delay corresponds to a non-surviving signal delay.

35. The selection method of claim 28 further comprising deleting one or more candidate from the state machine responsive to the results of searching for one or more surviving  
20 delays.

36. The selection method of claim 35 wherein deleting one or more candidate delays from the state machine responsive to the results of searching for one or more surviving delays comprises deleting one or more candidate delays corresponding to non-surviving signal  
25 delays from the state machine.



37. The selection method of claim 36 wherein deleting one or more candidate delays corresponding to non-surviving signal delays from the state machine comprises deleting one or more candidate delays from the exit state.

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38. The selection method of claim 28 wherein the receiver is a RAKE receiver.

39. A method for selecting one or more finger delays for a RAKE receiver comprising:  
receiving a signal having one or more signal images, each signal image having a  
corresponding signal delay;  
generating a hierarchical delay tree comprising a plurality of delay nodes in a  
5 lowermost level of the delay tree linked by branches and one or more linking  
nodes to a root node at the highest level of the delay tree, wherein each delay  
node is associated with a signal delay;  
searching through the delay tree to identify one or more surviving delay nodes;  
adding the candidate delays corresponding to the surviving delay nodes to a candidate  
10 pool; and  
selecting one or more finger delays for the RAKE receiver from the candidate pool.
40. The method of claim 39 wherein generating a hierarchical delay tree comprises:  
determining a signal characteristic for one or more signal delays;  
15 assigning a value based on the signal characteristics to the delay nodes;  
assigning a value to each linking node equal to the sum of the nodes in the next lower  
level connected by branches to the linking node; and  
assigning a value to the root node equal to the sum of the linking nodes at the level  
below the root node connected by branches to the root node.  
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41. The method of claim 40 wherein determining the signal characteristic for one or more  
signal delays comprises determining a signal energy associated with the one or more signal  
delays.

42. The method of claim 40 wherein determining the signal characteristics for one or more signal delays comprises determining a signal-to-noise ratio associated with the one or more signal delays.
- 5 43. The method of claim 39 wherein searching through the delay tree comprises:  
traversing downward through the delay tree; and  
at each level of the delay tree below the root node, identifying one or more surviving nodes.
- 10 44. The method of claim 43 wherein identifying one or more surviving nodes comprises:  
determining a level threshold for each level of the delay tree below the root node;  
comparing the nodes at one or more levels to the corresponding level threshold; and  
identifying the nodes that meet or exceed the level threshold as the surviving nodes.
- 15 45. The method of claim 43 further comprising:  
identifying non-surviving nodes at each level of the delay tree; and  
deleting subtrees depending from the non-surviving nodes such that the subsequent searches through the lower levels of the delay tree do not include the deleted subtrees.
- 20 46. The method of claim 43 wherein searching through the delay tree to identify one or more surviving delay nodes further comprises repetitively searching through the delay tree until a desired number of candidates delays are identified.

47. The method of claim 46 wherein repetitively searching through the delay tree until a desired number of candidates delays are identified further comprises increasing the level thresholds in a repeat search relative to an initial search to reduce the number of candidate delays identified.

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48. The method of claim 47 wherein repetitively searching through the delay tree until a desired number of candidates delays are identified further comprises limiting the repeat search to subtrees depending from surviving nodes in the previous search.

10 49. The method of claim 46 wherein wherein repetitively searching through the delay tree until a desired number of candidates delays are identified further comprises decreasing the level thresholds in a repeat search relative to an initial search to increase the number of candidate delays identified.

15 50. The method of claim 49 wherein repetitively searching through the delay tree until a desired number of candidates delays are identified further comprises limiting the repeat search to subtrees depending from non-surviving nodes in the previous search.

20 51. The method of claim 39 wherein adding the candidate delays corresponding to the surviving delay nodes to the candidate pool comprises inputting the candidate delays corresponding to the surviving delay nodes into a state machine, said state machine comprising a plurality of ordered states including a start state, a steady state, and an exit state.

25 52. The method of claim 51 further comprising assigning one or more candidate delays in one or more states of the state machine to respective RAKE fingers.

53. The method of claim 52 wherein assigning one or more candidate delays in one or more states of the state machine to respective RAKE fingers comprises assigning one or more candidate delays in the steady state to respective RAKE fingers.

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54. The method of claim 51 further comprising promoting and demoting candidate delays present in the state machine responsive to the results of searching through the delay tree.

55. The method of claim 54 wherein promoting and demoting candidate delays present in  
10 the state machine responsive to the results of searching through the delay tree comprises promoting candidate delays in the state machine from a first state to a second state when the candidate delay corresponds to a surviving delay node.

56. The method of claim 54 wherein promoting and demoting candidate delays present in  
15 the state machine responsive to the results of searching through the delay tree comprises demoting candidate delays present in the state machine from a first state to a second state when the candidate delay corresponds to a non-surviving delay node.

57. The method of claim 51 further comprising deleting one or more candidate from the  
20 state machine responsive to the results of searching through the delay tree.

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58. A delay searcher for a receiver to search a received signal having a plurality of signal images corresponding to a plurality of signal delays for one or more candidate delays, the delay searcher comprising:

a tree generator to generate a hierarchical delay tree comprising:

- 5 a plurality of delay nodes in a lowermost level of the delay tree, wherein each delay node is associated with a signal delay;
- a root node at the highest level of the delay tree;
- one or more linking nodes disposed between the root node and the plurality of delay nodes; and
- 10 branches that link the plurality of delay nodes to the root node via the linking nodes; and
- a tree searcher to search through the delay tree to identify one or more surviving delay nodes, wherein the one or more surviving delay nodes correspond to the one or more candidate delays.

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59. The delay searcher of claim 58 wherein the tree searcher searches through the delay tree by traversing downward through the delay tree and at each level of the delay tree below the root node, identifies one or more surviving nodes.

20 60. The delay searcher of claim 58 wherein the tree generator determines a level threshold for each level of the delay tree.

61. The delay searcher of claim 60 wherein the tree searcher searches through the delay tree by comparing the nodes at one or more levels to the corresponding level threshold and  
25 identifying the nodes that meet or exceed the level threshold as the surviving nodes.

62. The delay searcher of claim 61 wherein the tree searcher further identifies non-surviving nodes at each level of the delay tree and deletes subtrees depending from the non-surviving delay nodes such that subsequent searches through the lower levels of the delay tree do not include the deleted subtrees.

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63. The delay searcher of claim 60 wherein the tree searcher repeatedly searches through the delay tree until a desired number of candidate delays are identified.

64. The delay searcher of claim 63 wherein the tree searcher increases the level thresholds in a repeat search relative to an initial search to reduce the number of candidate delays identified.

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65. The delay searcher of claim 64 wherein the tree searcher limits the repeat search to subtrees depending from surviving nodes in the previous search.

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66. The delay searcher of claim 63 wherein the tree searcher decreases the level thresholds in a repeat search relative to an initial search to increase the number of candidate delays identified.

20 67. The delay searcher of claim 66 wherein the tree searcher limits the repeat search to subtrees depending from non-surviving nodes in the previous search.

68. The delay searcher of claim 58 further comprising a state machine comprising a plurality of ordered states including a start state, an exit state, and a steady state.

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69. The delay searcher of claim 68 wherein the state machine promotes and demotes candidate delays present in the state machine responsive to the results from the tree searcher.
70. The delay searcher of claim 69 wherein the state machine promotes candidate delays in the state machine from a first state to a second state when the candidate delay corresponds to a surviving delay node
71. The delay searcher of claim 69 wherein the state machine demotes candidate delays in the state machine from a first state to a second state when the candidate delay corresponds to a non-surviving delay node.
72. The delay searcher of claim 68 wherein the state machine deletes one or more candidate delays from the exit state responsive to the results from the tree searcher.
73. The delay searcher of claim 58 wherein the tree generator assigns a value to each linking node equal to the sum of the nodes in the next lower level connected by branches to the linking node, and wherein the tree generator assigns a value to the root node equal to the sum of the linking nodes at the level below the root node connected by branches to the root node.
74. The delay searcher of claim 58 wherein the received signal comprises a signal received at first and second receive antennas.
75. The delay searcher of claim 74 further comprising first and second state machines comprising a plurality of ordered states including a start state, an exit state, and a steady state,



wherein the first state machine receives the candidate delays associated with the first receive antenna and wherein the second state machine receives the candidate delays associated with the second receive antenna.

5 76. The delay searcher of claim 74 wherein the tree generator generates the hierarchical delay tree for the signal delays associated with the first receive antenna and wherein the tree searcher identifies one or more surviving delay nodes corresponding to the one or more candidate delays associated with the first receive antenna, the delay searcher further comprising:

10 a second tree generator to generate a second hierarchical delay tree for the signal delays associated with the second receive antenna; and  
a second tree searcher to search through the second delay tree to identify one or more surviving delay nodes, wherein the one or more surviving delay nodes correspond to one or more candidate delays associated with the second receive  
15 antenna.

77. The delay searcher of claim 76 further comprising first and second state machines comprising a plurality of ordered states including a start state, an exit state, and a steady state, wherein the first state machine receives the candidate delays associated with the first receive  
20 antenna and wherein the second state machine receives the candidate delays associated with the second receive antenna.

78. The delay searcher of claim 76 further comprising:  
a combiner to combine the candidate delays associated with the first and second  
receive antennas into a composite set of candidate delays; and  
a state machine comprising a plurality of ordered states including a start state, an exit  
state, and a steady state, to receive the composite set of candidate delays.
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79. The delay searcher of claim 78 wherein the combiner comprises an OR-gate.
80. The delay searcher of claim 78 wherein the combiner comprises an AND-gate.
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81. A state machine for providing one or more candidate delays to a receiver that receives a signal having one or more signal images, each signal image having a corresponding signal delay, wherein the receiver searches the signal delays to identify one or more surviving signal delays, the state machine comprising:
- 5 a plurality of ordered states including a start state, a steady state, and an exit state; and a controller to promote and demote candidate delays present in the state machine responsive to the search results.
82. The state machine of claim 81 wherein the controller promotes candidate delays from  
10 a first state to an adjacent second state.
83. The state machine of claim 81 wherein the controller promotes candidate delays from a first state to a non-adjacent second state.
- 15 84. The state machine of claim 81 wherein the controller demotes candidate delays from a first state to an adjacent second state.
85. The state machine of claim 81 wherein the controller demotes candidate delays from the first state to a non-adjacent second state.  
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86. The state machine of claim 81 wherein the controller deletes candidate delays from the state machine corresponding to non-surviving signal delays.
87. The state machine of claim 86 wherein the controller deletes candidate delays from  
25 the state machine corresponding to non-surviving signal delays in the exit state.

88. A RAKE receiver in a wireless network comprising:  
a front end receiver for receiving a signal having one or more signal images, each  
signal image having a corresponding signal delay;  
a delay searcher to generate and search through a hierarchical delay tree based on  
5 delay nodes associated with the signal delays to identify one or more surviving  
delay nodes, wherein each surviving delay node corresponds to a candidate  
delay; and  
wherein the RAKE receiver selects one or more RAKE finger delays from the  
candidate delays.
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89. The RAKE receiver of claim 88 wherein the delay searcher comprises a tree generator  
to generate the hierarchical delay tree, said hierarchical delay tree comprising:  
a plurality of delay nodes in a lowermost level of the delay tree, wherein each delay  
node is associated with a signal delay;  
15 a root node at the highest level of the delay tree;  
one or more linking nodes disposed between the root node and the plurality of delay  
nodes; and  
branches that link the plurality of delay nodes to the root node via the linking nodes.
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90. The RAKE receiver of claim 89 further comprising an energy estimator to determine  
a signal characteristic for one or more signal delays, wherein the tree generator assigns a  
value based on the signal characteristics to each delay node.
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91. The RAKE receiver of claim 90 wherein the signal characteristic comprises a signal  
energy associated with the signal delay.

92. The RAKE receiver of claim 89 wherein tree generator assigns a value to each linking node equal to the sum of the nodes in the next lower level connected by branches to the linking node, and wherein the tree generator assigns a value to the root node equal to the sum of the linking nodes at the level below the root node connected by branches to the root node.

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93. The RAKE receiver of claim 88 wherein the delay searcher further comprises a tree searcher to search through the delay tree by traversing downward through the delay tree, and at each level of the delay tree below the root node, identifies one or more surviving nodes.

10 94. The RAKE receiver of claim 93 wherein the delay searcher determines a level threshold for each level of the delay tree.

95. The RAKE receiver of claim 94 wherein the tree searcher searches through the delay tree by comparing the nodes at one or more levels below the root node to the corresponding level threshold and identifying the nodes that meet or exceed the level threshold as the surviving nodes.

15 96. The RAKE receiver of claim 95 wherein the tree searcher further identifies non-surviving nodes at each level of the delay tree and deletes subtrees depending from the non-surviving delay nodes such that subsequent searches through the lower levels of the delay tree do not include the deleted subtrees.

97. The RAKE receiver of claim 94 wherein the tree searcher repeatedly searches through the delay tree until a desired number of candidate delays are identified.

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98. The RAKE receiver of claim 97 wherein the tree searcher changes the level thresholds in a repeat search to identify a fewer or greater number of candidate delays.

99. The RAKE receiver of claim 98 wherein the tree searcher increases the level  
5 thresholds in the repeat search relative to an initial search to reduce the number of candidate delays identified.

100. The RAKE receiver of claim 99 wherein the tree searcher limits the repeat search to subtrees depending from surviving nodes in the previous search.

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101. The RAKE receiver of claim 98 wherein the tree searcher decreases the level thresholds in the repeat search relative to an initial search to increase the number of candidate delays identified.

15 102. The RAKE receiver of claim 101 wherein the tree searcher limits the repeat search to subtrees depending from non-surviving nodes in the previous search.

103. The RAKE receiver of claim 88 further comprising a state machine comprising a plurality of ordered states including a start state, an exit state, and a steady state, wherein said  
20 state machine receives the candidate delays corresponding to the surviving delay nodes.

104. The RAKE receiver of claim 103 wherein the state machine promotes and demotes candidate delays present in the state machine responsive to the results from the delay searcher.

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105. The RAKE receiver of claim 104 wherein the state machine promotes candidate delays in the state machine from a first state to a second state when the candidate delay corresponds to a surviving delay node
- 5 106. The RAKE receiver of claim 104 wherein the state machine demotes candidate delays in the state machine from a first state to a second state when the candidate delay corresponds to a non-surviving delay node.
107. The RAKE receiver of claim 103 wherein the state machine deletes one or more  
10 candidate delays responsive to the results from the tree searcher.
108. The RAKE receiver of claim 88 wherein the front-end receiver receives a first signal transmitted from a first antenna, said first signal having one or more signal images.
- 15 109. The RAKE receiver of claim 108 wherein the front-end receiver receives a second signal transmitted from a second antenna, said second signal having one or more signal images, and wherein the delay searcher generates a second hierarchical delay tree based on delay nodes associated with the signal delays of the second signal.
- 20 110. The RAKE receiver of claim 109 wherein the delay searcher searches through both delay trees to identify a set of surviving delay nodes associated with the first and second signals and selects one or more surviving delay nodes from the set of surviving delay nodes as the candidate delays associated with the first and second signals.

111. The RAKE receiver of claim 88 wherein the front-end receiver receives the signal at first and second receive antennas.

112. The RAKE receiver of claim 111 further comprising a combiner to combine signal characteristics received at the first and second receive antennas into a composite characteristic, wherein the delay searcher generates a hierarchical delay tree for the composite characteristic.

113. The RAKE receiver of claim 111 further comprising first and second state machines comprising a plurality of ordered states including a start state, an exit state, and a steady state, wherein the first state machine receives the candidate delays associated with the first receive antenna and wherein the second state machine receives the candidate delays associated with the second receive antenna.

114. The RAKE receiver of claim 111 wherein the delay searcher further comprises:  
a first tree generator to generate a first hierarchical delay tree for the signal delays associated with the first receive antenna;  
a first tree searcher to search through the first delay tree and identify one or more surviving delay nodes associated with the first receive antenna;  
a second tree generator to generate a second hierarchical delay tree for the signal delays associated with the second receive antenna; and  
a second tree searcher to search through the second delay tree to identify one or more surviving delay nodes associated with the second receive antenna.



115. The RAKE receiver of claim 114 further comprising first and second state machines comprising a plurality of ordered states including a start state, an exit state, and a steady state, wherein the first state machine receives the candidate delays associated with the first receive antenna and wherein the second state machine receives the candidate delays associated with  
5 the second receive antenna.
116. The RAKE receiver of claim 114 further comprising:  
a combiner to combine the candidate delays associated with the first and second  
receive antennas into a composite set of candidate delays; and  
10 a state machine comprising a plurality of ordered states including a start state, an exit  
state, and a steady state, to receive the composite set of candidate delays.
117. The RAKE receiver of claim 116 wherein the combiner comprises an OR-gate.
- 15 118. The RAKE receiver of claim 116 wherein the combiner comprises an AND-gate.

119. A circuit for processing a received signal having one or more signal images, each signal image having a corresponding signal delay, the circuit comprising search circuitry to generate and search through a hierarchical delay tree based on delay nodes associated with the signal delays to identify one or more surviving delay nodes, wherein each surviving delay  
5 node corresponds to a candidate delay.

120. The circuit of claim 119 wherein the search circuitry includes tree generation circuitry to generate the hierarchical delay tree, said hierarchical delay tree comprising:

a plurality of delay nodes in a lowermost level of the delay tree, wherein each delay  
10 node is associated with a signal delay;

a root node at the highest level of the delay tree;

one or more linking nodes disposed between the root node and the plurality of delay  
nodes; and

branches that link the plurality of delay nodes to the root node via the linking nodes.  
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121. The circuit of claim 119 wherein the search circuitry searches through the delay tree by traversing downward through the delay tree, and at each level of the delay tree below the root node, identifying one or more surviving nodes.

20 122. The circuit of claim 121 wherein the search circuitry determines a level threshold for each level of the delay tree.

123. The circuit of claim 122 wherein the search circuitry searches through the delay tree by comparing the nodes at one or more levels to the corresponding level threshold and  
25 identifying the nodes that meet or exceed the level threshold as the surviving nodes.

124. The circuit of claim 123 wherein the search circuitry further identifies non-surviving nodes at each level of the delay tree and deletes subtrees depending from the non-surviving delay nodes such that subsequent searches through the lower levels of the delay tree do not include the deleted subtrees.

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125. The circuit of claim 119 wherein the search circuitry repeatedly searches through the delay tree until a desired number of candidate delays are identified.

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